DOCUMENT RESUME

ED 276 200 EC 190 966

AUTHOR Fiorito, Eunice; And Others
TITLE Media and Technology. Section IV.
PUB DATE May 86
NOTE 19p.; In: Walker, Sylvia, Ed. And Others. Equal to the Challenge: Perspectives, Problems, and Strategies in the Rehabilitation of the Nonwhite Disabled. Proceedings of the National Conference of the Howard University Model to Improve Rehabilitation Services to Minority Populations with Handicapping Conditions (1984); see EC 190 962.
PUB TYPE Speeches/Conference Papers (150) -- Reports - Research/Technical (143) -- Information Analyses (070)

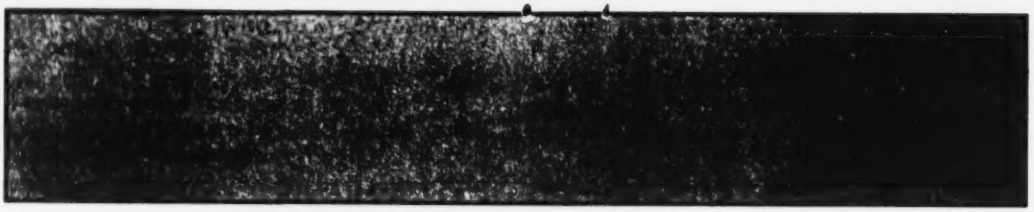
EDRS PRICE MF01 Plus Postage. PC Not Available from EDRS.
DESCRIPTORS *Accessibility (for Disabled); *Assistive Devices (for Disabled); Blacks; Church Role; *Disabilities; *Information Services; *Minority Groups; News Media; Public Relations

ABSTRACT

This document contains three papers about media and technology presented at a national conference on the nonwhite disabled. In "Overcoming" (E. Fiorito and J. Doherty), a comparison is made between treatment of blacks and the disabled as inferior citizens. Ways in which both populations can work more closely with the media to promote awareness and provide information are discussed. In "Images and Identity--In Marketing Adults with Disabilities in the Media," J. W. Fowler presents an overview of marketing strategies and recommendations instituted by the President's Committee on Employment of the Handicapped to ameliorate negative images and stereotypes of the disabled. "New Assistive Technologies and the Nonwhite Disabled" (R. W. Nicholls) discusses the need for a partnership among disabled individuals, service providers, and manufacturers which could promote awareness, cost-effectiveness, availabilty, and equal access to assistive technologies for the disabled. (CB)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED276200



12 • Overcoming

EUNICE FIORITO
OSERS
U. S. Department of Education
JIM DOHERTY

Abstract

The authors make a comparative analysis of the treatment of blacks and the disabled as inferior citizens. They also discuss the role the media plays in perpetuating the attitudes and stereotypes reflecting the prejudice toward both groups. Blacks and disabled individuals have the responsibility of working more closely with the media in providing information on the rehabilitative services available and in promoting a more realistic perspective of their potential.

Being black in the United States is still a disadvantage. Being disabled in the United States is also a disadvantage. Being both black and disabled puts a person in double jeopardy. And, unlike the popular game show, this condition lasts a lot longer than a few money-making minutes.

Traditional prejudice still forces black people away from opportunity and into low-paying, low-prestige positions in society and the work place. Prejudices of a different sort, often based on good intentions, have the same detrimental effect on people with disabilities. Legislation and landmark court decisions have served to blunt the effect of these ancient bigotries, but society's attitudes and the stereotypes they engender live on.

Unfortunately, these attitudes and stereotypes are perpetuated—perhaps inadvertently—by the news and entertainment media. I say "perhaps inadvertently" because media depictions of black and/or disabled people are both a cause and a result of the general public's view of these population groups. For example, a main character in a dramatic presentation may acquire a disability as a result of accident or illness, but there is always the glorious day of the total cure because viewers are uncomfortable with wheelchairs or white canes. Likewise, a news story about a black star in sports or business usually tells how this person fought his or her way out of the ghetto because many readers believe all black people begin in the ghetto. In both instances, the media are at once reflecting and feeding traditional beliefs—beliefs that must be changed if we are ever to gain the status we seek, that of full and equal participants in the life of our nation and our community.

I must say here that the fault does not lie entirely with the media. We who are black

"PERMISSION TO REPRODUCE THIS MATERIAL IN MICROFICHE ONLY HAS BEEN GRANTED BY

Sylvia Walker

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☑ This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

EC190966

and/or disabled often contribute to the situation. We naturally welcome praise for an achievement and the publicity that might come with it. But if we are not careful, we may lend support to the idea that success is the exception, not the rule, for people like us. We always say that equality of opportunity is our goal. We want to succeed or fail on our own merits, not because of some prejudice or special affirmative action program based on race or disability. As long as the achievers among us are singled out as atypical, that equality will be difficult to realize.

What can we do? For one thing, we can work with the media on a continuing basis, not just at the time of a major event. Communication and exposure can sweep away myths and create understanding of the real dimensions of our life situations. In recent years, school integration and the inclusion of black people in TV commercials, comedies, and dramas have shown white Americans that their black neighbors' abilities, strengths, and weaknesses are not really different from their own. Any disabled person can tell you how a personal encounter has changed someone's distorted view of disability. But on a one-to-one or small group basis, we will never get our message to everyone in the nonblack or nondisabled world. The media can and must take on a more active role in this education process.

In order for this to happen, people in the media must themselves accept certain facts, facts which are often startling when first pointed out. For example, the only thing a blind person cannot do is *see*; the only thing a deaf person cannot do is *hear*; the only thing a wheelchair user cannot do is *walk*. Of course, a particular physical limitation may make some activities impractical. I doubt, for instance, that we will ever see a blind person win the Indianapolis 500. But the limitation affects only that particular physical ability; it does not automatically augment or diminish a person's intelligence, ambition, emotional development, or sensitivity. Similarly, people in the media must accept the fact that Dr. Shockley is indeed wrong; nothing in blackness creates an inferior person. It is centuries-old prejudices and misconceptions, not disability or blackness, that have spawned and nurtured the image of the helpless handicapped and below-average blacks. Media people who realize this—and many do—can be of great help to us in fighting the prejudices and correcting the misconceptions.

I am pleased to say that some progress is being made. Earlier I mentioned that black people are finally being given more realistic exposure on television. Even disabled people are doing better in this regard. I would like to give an example. Years ago, in an episode of the "Barnaby Jones" detective series, the killer pretended to be blind. Barnaby, in his wisdom, saw through the deception when, during a visit to the man's home, he noticed that the television set was warm. Generally, blind people do not "watch" television although, as is true of many sighted people, they may "listen" to it or have it on for company. In this example, however, Barnaby's suspicions proved to be true.

This bit of stupidity is in fine contrast with something now being done on the soap opera "Guiding Light." For several months, one of the characters has been a blind woman who runs a kind of adjustment or rehabilitation center. Though she may not stay in the story, her independence and generally "normal" way of life has been well presented.

Rehabilitation of the type depicted in "Guiding Light" is often a necessary part of a disabled person's life. We consider it a community resource, somewhat similar to adult education classes, Red Cross first aid training, and recreation programs provided by a city or state. As with such resources in general, many who could benefit from them do not know they exist or how they can be useful. Here again, the media can be of tremendous help. Feature articles and talk shows could focus on state and local agencies, their programs, successes, and their failures. When such an effort is undertaken, I would urge that the clients of these agencies be portrayed not as "needy" and "dependent" but as potential taxpayers on the road to productivity. If media staff members really want to be helpful, they could volunteer to prepare public service announcements about rehabilitation programs and run them during peak listening and viewing periods—not just at 3:18 Sunday morning.

Several years ago, the disabled community made headlines by demonstrating at the offices of the U.S. Department of Health, Education and Welfare. The purpose of the demonstration was to bring about regula-

tions prohibiting discrimination against disabled persons in federally supported programs and activities. One of the men handling publicity for the demonstration had cerebral palsy. His work took him to the studios of Washington's Channel 4. When he left he shared a taxi with Jim Vance, a newsman who is black. As they discussed the demonstration—the reasons for it and the benefits to be derived from the hoped-for regulations—the man with cerebral palsy told Mr. Vance: "We are today's niggers." By that he meant that we, too, had been considered second-class citizens for centuries; that we, too, had been ignored or relegated to "special" categories, and that we, too, were beginning to assert ourselves and were thereby incurring some of the backlash that was so familiar to black Americans.

Like our black brothers and sisters, disabled people want to be respected as a population group and as individuals. We want to break down the barriers that keep us in those "special" categories. We want to be free to participate fully in all aspects of living. We have a long way to go, but the example of our black brothers and sisters is an inspiration. Like them, we *will* be successful. *We, too, shall overcome!*

Bibliography

Bernotavicz, F. (1979). *Changing attitudes towards the disabled through visual presentations: What the research says.* Portland, ME: University of Southern Maine, Human Services Development Institute, Center for Research and Advanced Study.

Elliot, T., Byrd, E.K., and Byrd, P.D. (1983). An examination of disability as depicted on prime-time television. *Journal of Rehabilitation, 49*(3), 39-42.

Elliot, T. and Byrd, E.K. (1982). Media and disability. *Rehabilitation Literature, 43,* 348-355.

Lattin, D. (1977). Telethons: A remnant of America's past. *Disabled USA, 2*(7), 4-5.

Leonard, B. (1978). Impaired view: Television portrayal of handicapped people. Unpublished Doctoral Dissertation. Boston University, 1978.

Wall, O. (1978). Mental illness and the media: An unhealthy condition. *Disabled USA, 2*(2), 23-24.

13 • Images and Identity—In Marketing Adults with Disabilities in the Media

JESSE W. FOWLER

President's Committee on Employment of the Handicapped

Abstract

The media, one of the most powerful tools of communication, has a significant influence on the development of attitudes and stereotypes held by the general public toward the disabled community. This article presents an overview of the marketing strategies and recommendations instituted by the President's Committee on Employment of the Handicapped to ameliorate these negative images and stereotypes by implementing public relations efforts which depict and demonstrate the positive and multidimensional abilities of persons with disabilities. Included also are alternative constructive guidelines which emerged from an international media seminar sponsored by the United

Nations. The guidelines were designed to facilitate the accurate portrayal of individuals with disabilities while still encouraging the range of creativity and individuality inherent in the media industry. Information is also provided to disability organizations and individuals with disabilities on a plan of action for developing skills to gain access to the media.

The media/entertainment industry is one of the most powerful tools of communication. However, its recognition of persons with disabilities as complete individuals is long overdue (National Easter Seal Society, 1981). Whether one views a medium as a window on a wider world or as a mirror on one's own surroundings, the media's capacity to examine and communicate people, places, and ideas is unequalled (United Nations, 1982).

The lack of positive public images hampers the quest by persons with disabilities for social and economic integration. What the public perceives as reality and how it reacts to certain groups often define that group's "place" in society. The milieu of that "place" can be characterized by restrictions and limitations which the public generally associates with disability.

Society's major image makers generally include non-disabled male leaders in government and business. Through the media, these image makers influence the public by projecting their opinions of the disabled formulated by their limited experiences. Consequently, these stereotypes formulate the barriers which segregate the able-bodied from persons with disabilities. How the media portrays persons with disabilities truly influences the views and attitudes of society (Media Office, 1985).

Telethons, fundraisers, and television specials present images of need and vulnerability which underscore an identity of dependence. Motion pictures, live stage performances, and other forms of entertainment frequently depict persons with disabilities as extremely brave and perserverring or alternatively as emotionally unstable, desperately searching for love and acceptance. News stories generally show persons with disabilities as outcasts. They are either dissatisfied with society's response to their needs or are achieving goals despite insurmountable odds given the degree of severity of their impairment. Such portrayals of persons with disabilities as superhumans may inadvertently create confusion or doubt in the minds of the general public. Leslie A. Felder (1982) explains that such:

> . . . ersatz sagas of heroic groups, then, merely turn upside down rather than dissolve the sense of immitigable difference which lies at the root of our troubled response to persons with disabilities, by making them super rather than human. Worse, by their relentless emphasis on the positive, such stories exacerbate rather than release our negative feelings of hostility and guilt, leaving the public more conflicted than ever.

Obviously, the public sees disability in terms of neediness and lack of self-determination. Consequently, programs are organized which treat persons with disabilities as dependent persons incapable of fully participating in society. The existence of programs espousing this attitude in turn validates the public image of disability.

Does the communication industry have a responsibility to change attitudes, images, and expectations of the general public toward people with disabilities? Concerned citizens and the disabled community think so. Maurie Goodman (1979), a performer, stated it bluntly: "The industry has an absolute responsibility. Television is the single most moving force in modern history. It has the power to change minds, attitudes, and lifestyles. There is a responsibility that comes with that" (Littinson, 1985).

Representatives from the disabled community met with the decision-makers of the National Broadcasting Company, Inc. (NBC) to enlighten them in regard to their responsibility. Critical of NBC's portrayal of the main character in a particular movie, Alan Toy, a performer with disabilities, testified on behalf of the disabled community: "What we want to see is more realism and normalization and less of the superhero image. Our condition should not be used as a reason for inspiration. We do not want to be inspiring. We just want to be accepted like everyone else" (Littinson, 1985).

In light of all of this, it is no wonder that the business world ignores disabled adults as consumers and media performers. Indeed, because of a poor public image, persons

with disabilities are practically nonentities in the world of commerce and entertainment. Quite naturally, the people who sponsor television shows and finance theater and film productions are reluctant to show individuals with impairments in realistic roles. Those who underwrite advertisements to market products understandably fail to recognize persons with disabilities as part of the buying public.

This was made clear in 1979 when Birnak, an advertising firm, contacted major corporations concerning the appearance of persons with disabilities in their television commercials. The following are statements from some of the responses received:

> . . . we would not wish to have our advertising messages misinterpreted by those who may feel that we sought to capitalize on the physical handicaps of individuals in order to 'sell a product.' . . . But showing them in our commercials is a different story. It's a sad fact of life, but if we put them in our advertising, we are criticized for taking advantage of them commercially. People accuse us of seeking sympathy by placing them in advertising (Littinson, 1985).

This problem of image and identity is important to fully understanding why integrating persons with disabilities in advertising, product marketing, and other manifestations of social equality and public acceptance have been confronted with barriers.

Also supporting the "place" of disabled persons in contemporary society is the absence of reliable statistics about the disabled community. The business world lacks information which is necessary for establishing a marketing identity. Who are adults with disabilities? Where are they? What are their incomes? What do they need, buy, and watch on television?

Moreover, businesses ignore posing such questions in marketing research. Statistics available from government sources are not the type that stimulate businesses to perceive persons with disabilities as part of the buying public. Thus, persons with disabilities have no marketing identity. As a result, manufacturers and providers of services (including the entertainment industry) avoid addressing adult disabled persons as consumers to seek out and win.

Given this situation, can a better, more realistic image and marketing identity for persons with disabilities be possible? The efforts of the President's Committee have shown that it can happen. Our public service advertising campaigns have long been designed to offset traditional attitudes toward adult persons with disabilities. Starting in the mid-1970's we developed a marketing concept which was revolutionary.

Working with the faculty and students from the School of Visual Arts in New York City, we designed materials for print and television advertising which presented people with disabilities as capable, productive persons. With an equal opportunity, they would be just as successful as able-bodied persons. To enhance this positive image and identity, our marketing strategy involved far more than merely featuring a casual picture of people with disabilities. Visually and verbally—even when it conflicted with prevailing professional wisdom—each advertising product focused on the individual qualities of adults with disabilities, their rights and their interests.

The more recent advertising campaigns of the President's Committee have been unique in another respect. We have purposely addressed a dual audience—business people and individuals with disabilities—because the image and identity which persons with disabilities have of themselves go hand in hand with the public's image. Persons with disabilities were presented as positive role models. By featuring in our advertising materials adults with disabilities who were competing successfully in society, we strived to encourage other individuals with disabilities (especially those who could benefit from further education and additional jobs skills) that it was possible for them, too.

Make no mistake, getting society to absorb a new image and identity for adults with disabilities is larger than the resources of any one agency or institution. Nevertheless, the impact of each effort can be quite pervasive. With the limited resources and small budget available to the President's Committee, we provide some 4,000 businesses, trade and consumer publications with good quality, attractive, and effective public service materials.

Producing a public relations program for disabled adults (1979) was just one of the

few relevant products developed. Businesses and professionals in the media are now contacting the President's Committee. These individuals have seen our advertisements and want to know how to effectively reach adults with disabilities as consumers, as an audience, and as potential employees.

In the years since the President's Committee first instituted a modern marketing plan, we have learned that we were in the forefront of using marketing tools to further a social cause. Academicians discovered in the 1970's that marketing could be adapted to social programs with benefit to the programs and its recipients. Nowadays, there is strong interest in the use of marketing concepts in the non-profit world. In May 1985, the President's Committee will collaborate its efforts with the National Easter Seal Society and the American Association of Disability Communicators to explore and expand the use of marketing concepts at a communications seminar, "Media and Disability Seminar," scheduled to be held in Chicago.

We have also been fortunate to see the development of leadership organizations such as the Screen Actors Guild which functions as a liaison between the disabled community and the media/entertainment industry. The United Nations convened in Vienna during the summer of 1982 with a group of specialists from around the world to formulate guidelines for the inclusion and portrayal of disabled people in the media. While guidelines were developed as suggestions, those attending the convention encouraged the range of creativity and individuality that is inherent in the media industry. These guidelines, as revised by a subgroup on the basis of the world-wide review, are as follows (United Nations, 1982):

1. Depict people with disabilities at home, at work, at school, at leisure, and in a variety of other ordinary social and physical situations.
2. Acknowledge the natural curiosity and occasional awkwardness that may develop in social situations involving disabled and non-disabled individuals. Where appropriate, provide positive examples in which such curiosity is satisfied and in which awkwardness is lessened.
3. Include people with disabilities as part of the general population in media products in addition to those in which their story is the primary focus.
4. Avoid presenting people with disabilities as dependent or pitiful. Other stereotypes to be avoided include presenting people with disabilities as inherently saintly or asexual, gratuitously dangerous, or uniquely endowed with a special skill due to a disability.
5. Consider carefully the words used to describe or characterize disabled individuals. Recognize and avoid phrases that may demean these individuals (e.g. blind as a bat, deaf and dumb).
6. Portray people with disabilities in the same multidimensional fashion as others.
7. Present the achievements and difficulties of people with disabilities in ways that do not overemphasize the impairment, exaggerate, or emotionalize the situation. For example, in news stories and documentary reports, the fact of a person's disability should be reported only when it is directly relevant.
8. Information should be provided to the public about prevention and treatment of impairments that lead to disability, as well as the availability of services for people with disabilities and their families. This can be done through public information campaigns and also can be integrated into general media products.

Recommendations were also made to organizations of and for people with disabilities. They include the following (United Nations, 1982):

1. Promote and make widely available to the major media the guidelines developed by this seminar. Whenever possible, organizations are urged to communicate the guidelines through direct personal contact with those individuals responsible for developing and producing media.
2. Establish a system by which media presentations about persons with disabilities can be systematically and critically examined and by which the results of such examination, positive and negative, is regularly reported to the media.
3. Collect examples of outstanding pre-

sentations of subjects related to disability in the different media forms and bring them to the attention of all media.

4. Organize seminars of persons with disabilities, advocates, and media representatives to develop and implement plans for promoting public awareness, understanding, and acceptance of people with disabilities. Such plans should be reviewed and revised regularly.
5. Establish an information service to provide personal and practical assistance to the media in their efforts to develop products for and about persons with disabilities.
6. Develop a network to encourage and train people with disabilities to participate on all levels and in all forms of the media. Include in-service training programs, seminars, workshops, and informal clubs in which persons with disabilities may develop their skills in all fields related to the media. These different forums should, whenever possible, include participation by people who are not disabled.
7. Ensure that all institutions and organizations dealing with training and research in fields associated with the media incorporate disability-related subjects as a regular part of their work.
8. Make use of mobile media units where appropriate to inform about prevention, education, rehabilitation, and training of disabled persons.
9. Ensure that people who are disabled, their families, and communities are taking an active part in media activities through group discussion, community activities, and feedback to the media (e.g. radio forums, teleclubs, reading groups, cineclubs, and viewing sessions for and by the target groups).
10. In addition to the mass media, give attention to oral and other traditional forms of communication, especially in areas not regularly served by the mass media.
11. Coordinate, on a national basis, all actions taken in regard to the media with other organizations of and for disabled persons.

Anyone contemplating developing a marketing plan must keep one thing always in mind: You cannot be successful by simply presenting whatever image or identity you find appealing. The public generally has a point of acceptance beyond which unusual or unfamiliar images will have an adverse affect on the advertiser. Marketing strategies can be agents for social change, but successful ones are those which stay abreast of what the public can or will tolerate.

Examples of advertising captions from different materials developed over the years by the President's Committee illustrate this principle. In the 1950's and 1960's, the depersonalized slogan "Hire the Handicapped—It's Good Business" was used extensively. In 1975, we developed a more personal slogan: "I do, I think, I feel." Advertisements developed later did not utilize catchy remarks or slogans. Instead, they developed various captions to highlight different public service materials.

The headline of one printed material proclaims: "I have the same right to live, I want a piece of the same pie and damn it, I'm gonna get it." The quote is from a past Handicapped American of the Year, and it forthrightly expresses his view on his place in society. It's a strong advertisement; one that would not have been possible a few years ago. Yet it presents the public with a new and acceptable image of disability.

From a marketing standpoint, adults with disabilities are a solid "product." The millions of dollars in donated public service space for the President's Committee's advertising materials verify this. Marketing an image and a new identity for adults with disabilities is possible with planning, foresight, creativity, and networking.

Bibliography

California Foundation on Employment and Disability. (1985). Sacramento: Media Office.

Felder, L.A. (1982). Pity and fear: Images of the disabled in literature and the popular arts. New York: International Center for the Disabled.

Littinson, K.G. and King, P.C. (1985). Ability and opportunity. *Rehabfilm Newsletter, 15.*

Lobodinski, J., McFadden, D., and Markowicz, A. (1984). *Marketing Your Abilities: A Guide for the Disabled Job Seeker.* Washington, D.C.: Mainstream, Inc.

Maryland State Department of Education. (1984). *Pick A Title: A Collection of Media About the Handicapped*. Baltimore: Department of Education, Division of Special Education.

Menninger Foundation. (1984). Preventing disability dependence. Paper presented at Menninger Foundation Research and Training Center, Topeka, KS.

Minnesota State Council for the Handicapped. (1982). Responding to Disability: A Question of Attitude. Minneapolis.

National Easter Seal Society. (1981). Portraying persons with disabilities in print. *Rehabilitation Literature, 42,* (9-10).

President's Committee on Employment of the Handicapped. (1979). *Preparing Public Speeches*. Washington, D.C.

President's Committee on Employment of the Handicapped. (1979). *Producing A Public Relations Program for Disabled Adults*. Washington, D.C.

President's Committee on Employment of the Handicapped. (1979). *Publicity Tips*. Washington, D.C.

United Nations. (1982). *Improving Communications About People With Disabilities*. Recommendations of a United Nations Seminar in Vienna. New York: Rehabilitation International.

14 • New Assistive Technologies and the Nonwhite Disabled

ROBERT W. NICHOLLS
Howard University

Abstract

New assistive technologies can enable the nonwhite disabled to experience increased efficiency in environmental interaction, thus providing them with an easier means to obtain education, employment, and independence. However, small entrepreneurial businesses which market specialized technology to ε consumer group that is neither large nor lucrative are forced to charge high prices. As a result, new devices are beyond the reach of the majority of the nonwhite disabled, one of the least financially stable groups in society. Without intervention, a convergence of race, socio-economic status, and disability seem destined to consolidate the nonwhite disabled as a disadvantaged group in the computer age. A trilateral partnership between disabled individuals, service providers, and manufacturers could help enlighten attitudes concerning the innovative but unfamiliar new technologies while it highlights issues of cost, availability, and equity of access.

The revolutionary effects of the computer age are especially relevant to the nonwhite disabled. By enabling persons with disabilities to interact with the environment in a host of new ways, possibilities emerge that have never previously been considered. The new assistive technologies can release the potential "locked" within disabled individuals by their impairments. These technologies have the capability of dramatically extending the range of educational and life opportunities of disabled individuals and enable them to live more independent lives and hold jobs previously closed to them. The silicon chips that activate an industrial robot can equally well be used to control an inter-

active robotic device for a severely disabled person. Similarly, if a paralyzed individual has at least one consistent body movement such as the ability to blow on a pneumatic straw or wiggle a head pointer, then that individual has the capability to design a skyscraper or attain any other major achievement that modern computer usage provides.

A surge of interest in special education and rehabilitation has occurred in recent years. This is reflected in the allocation of funds to these areas. According to Kakolik (1983) approximately $4.6 billion was allocated to special education by federal, state, and local education agencies in 1976. By 1983, the total funding had increased to more than $12 billion with a projected increase by 1985 to approximately $15 billion. A substantial portion of these funds will go to courseware aspects. According to Blaschke (1985), "the National Audio Visual Association has projected a higher rate of increase in per pupil expenditures in special education for instructional equipment and materials than in education generally, from $367 million in 1982 to $650 million in 1985." Blaschke suggests that this flow of funds provides a strong inducement for the private sector to attempt to penetrate or expand its market share in special education. A high priority for the National Institute of Handicapped Research (NIHR) has been to involve private industry in the production and marketing of equipment that assist persons with disabilities to live independently. In order to direct major emphasis to this aspect they have developed linkages with the Electronic Industries Foundation (EIF). Industry's role in marketing assistive devices has been identified as a key to the success of these efforts.

The scientific community is predictably interested in the interaction between the disabled and the new technologies, for this is an era when the interface between man and machine is developing a whole new significance. Just as the performance of highly modified cars on the race track supplies valuable insights and improvements to automobile assembly, so can the adaption of technologies to perform human tasks provide valuable insights into the area of man-machine interface, robotics, and artificial intelligence. The net result of the advancement in scientific knowledge could benefit society as a whole. It is of paramount importance, however, that high-tech experiments with assistive devices result in more tangible outcomes than merely advancing scientific knowledge and benefit the disabled population for whom the devices were originally developed. Production and marketing initiatives from industry are of crucial significance.

A distinction must be made between the assistive technologies with which this paper deals and technological developments that involve bioengineering systems and surgical processes. The latter are exemplified by experiments in "functional electrical stimulation" which are currently taking place at the Veterans Administration Medical Center in Cleveland, Ohio. They involve the surgical implant of electrodes to activate paralyzed limbs. These developments currently represent the ultimate in man-machine interface, whereby the machine becomes part of the man. Assistive technologies, however, are essentially different. Although they are tailored to an individual's functional ability, they remain external to the user and, unlike bioengineering processes, represent nothing more than specialized "tools" that man has developed to deal with the environment. Leifer (1983) states that "the evolution of mankind can be measured in terms of our mastery of tools. Tools allow us to control our environment in ways quite beyond our native ability. Hand tools have become machine tools and now (with robotics) machine tools have evolved hands." The new assistive technologies for the disabled can be classified into five overlapping categories.

1. ADAPTATIONS TO THE BODY AND SENSES: leading in some cases to greater physical maneuverability and/or a greater degree of success in environmental interaction and in other cases to a greater communicative ability.
2. ADAPTATIONS TO THE PRIVATE LIVING ENVIRONMENT: allowing a greater degree of control and increased independence.
3. ADAPTATIONS TO THE EDUCATIONAL ENVIRONMENT: leading to the acquisition of skills and improved abilities.
4. ADAPTATIONS TO THE WORKPLACE: leading to increased employment opportunities.

5. ADAPTATIONS TO THE PUBLIC REALM: leading to greater accessibility.

In providing an overview of some new assistive devices the aim of this paper is not simply to eulogize over the achievement of technology, significant though these may be. Issues of availability, cost, and equity of access must be considered in any discussion of assistive technologies for the nonwhite disabled. The purchase prices (as of September 1985) of the devices are discussed in the remarks that follow the description of the various technologies. Issues of funding, advocacy, and consumer education are considered within the concluding remarks. The production of assistive devices is a volatile industry in which technologies compete, therefore, the information contained in this paper is time-sensitive.

An initial problem in the development of most technologies is that of cost. When a new technology first appears on the market the price of the prototype models is normally prohibitive to all but a few. In time, as a result of standardization of design and an increase in production level in response to (an anticipated) demand, the price may decline considerably. This situation is particularly pertinent in relation to the new assistive technologies. Often an assistive device is the sole product of a small company. Unger (1983) emphasizes the role of independent inventors in the production process and asks "Who produces the innovative and appropriate technology? Is it our universities? Is it our IBMs? Numerous studies in the last 20 years have shown again and again that independent inventors and small businesses are the predominant producers of the new, innovative technology in this country." Many of the devices described in this overview are marketed by small companies that have been formed by an individual just to get an invention going. Small entrepreneurial businesses are notably vulnerable with high overheads and this is reflected in the price of the product. The problem is compounded by the fact that the disabled population represents a very specialized market which is neither large nor lucrative. As a result, the initial cost of an assistive device may be prohibited to many of the disabled population who have no means of securing the purchase price.

Issues of equity arise with considerations of availability and cost. Already within the computer revolution the question of who are the beneficiaries of the new technologies, is being asked. Unequal access to computer and telecommunications technology increases the disparities between the privileged elite and the less affluent, thus minorities and the disadvantaged are being left behind. This raises disturbing questions for the nonwhite disabled for, as Bowe (1983) reports, they represent one of the least financially stable groups in American society.

Technology that helps integrate the minority disabled into the mainstream of society and provide them with independence and employment is urgently needed. Independence is a basic human right. In some cases adults are forced to remain in institutions because they do not have the necessary funding to acquire daily living technology that would enable them to reside at home or in their own apartments. Employment is also fundamental to human existence as we know it, yet the nonwhite disabled are victims of less than equal treatment. Citing the Current Population Survey (CPS) of 1981, Bowe reports that only 18.8% of black disabled males and 14.6% of black disabled females are employed. This creates a "Catch-22" situation for many minority individuals with disabilities for they cannot afford the technology that could lead to employment, which in turn would provide the money to pay for the technology.

Technology could become the great equalizer for all disabled people by providing them with an easier means to be educated, competitive in the job market, and endowed with dignity and independence. The economic advantages of such independence are considerable. Bowe (1980) estimates that every dollar spent for rehabilitation research returns $11.00 in cost benefit to society. Encouragement in this direction is forthcoming from major companies such as International Business Machines (IBM). IBM is funding research at the University of Michigan that will help stroke victims use the IBM PC to regain their reading and memory skills. IBM has also helped to initiate programs at 30 training centers where disabled individuals learn data processing skills. More than 1,500 have been trained and more than 80% have found jobs. Employment pos-

sibilities are also being explored in such programs as the technology work evaluation program (TWE) at Courage Center in Golden Valley, North Dakota. This program explores an individual's potential to enter computer programming training or pursue employment in the computer field. The blind are already experiencing expanded employment opportunities as programmers, input and credit verification operators, inventory controllers, word processors, reservation agents, and auditors. Visually impaired attorneys are assisted in their research by the Legal Talk Computer and state of the art electronic devices which enable them to access JURIS and WESTLAW databases (Bordley, 1984).

The section that follows focuses on various new assistive devices that are available for the disabled. They are discussed within the context of four areas of disability; visual impairments, mobility impairments, hearing and speech impairments, and impairments in cognitive functioning. Mentioning some devices by the product name under which they are marketed rather than by a generalized classification cannot be avoided. Often an assistive device is the only one of its kind and is not therefore embraced within a larger category.

VISUAL IMPAIRMENTS

Various magnifying instruments exist for the partially-sighted. Closed-circuit television reading devices are the most sophisticated technology in this category. Such products as the Viewscan Text System (VTS) can help the partially-sighted prepare typewritten manuscript. It comprises a large character screen for reviewing text before it is automatically printed out by an electric typewriter. A miniature hand-held scanning camera for reading printed text is included.

In the past, to access written or printed material, the blind have had to rely on sighted people reading to them, either directly or through the medium of a tape recorder. The Optacon (optical-to-tactile converter) is a tactile reading aid that attemps to remedy this situation. It is different from reading machines or talking terminals which it predates. It converts the image of a letter into an enlarged vibrating form that can be felt with one finger. Both print and handwriting can be read in this way (Lyons, 1984). Talking scales were the first device to emit voice output. They have been followed by talking calculators, talking clocks and watches, and talking thermometers. Other assistive gadgets for the blind include: a liquid level indicator which utilizes a sound source and is used when filling cups or flasks; the Mowat Sensor, a small hand-held device that uses high-frequency sound waves to warn of the proximity of objects; and a device marketed by the American Foundation for the Blind which identifies paper currency.

Paperless braille devices such as the Microbraille or the VersaBraille System act as braille word processors. An electronic keyboard with cassette storage provides braille writing, reading, editing, and display capabilities. When connected to an electric typewriter, paperless braillers can create typewritten manuscript from braille material, or, alternatively create braille copy from a typed text. The Viewscan, Microbrailler, and VersaBraille can be interfaced with computers and telecommunications devices.

The Kurzweil Reading Machine

The Kurzweil Reading Machine (KRM) provides the blind with direct access to printed or typewritten information by converting it into synthesized speech. The KRM, by virture of its optical character recognition, has the ability to read virtually any typeface. Material to be read is placed face down on the glass surface of the desk top scanning unit which automatically locates the first line and begins reading the text. The control unit provides adjustment to the volume, speech rate, and pitch of the electronic voice. The machine has the ability to spell out words that may be obscure, announce punctuation and capitalization, repeat previous lines, and "tag" certain words or phrases for later reference. The KRM can also be used to provide synthesized speech to a computer terminal or produce braille hardcopy when connected to a braille printer. Raymond Kurzweil's latest invention is a voice activated typewriter (VAT) that will prepare typed manuscript from verbal dictation.

Talking Terminals

There are various microcomputer accessories, most of them involving speech synthesizers, that enable blind persons to have

the same opportunity as sighted computer users. The Echo GP speech synthesizer for example, converts an Apple PC into a talking terminal. Word processing capabilities can be obtained by means of a speech device such as the Vert 6000 which can be set to verbalize each letter, word, sentence, or page that is typed. As a result blind students and professionals can type and edit their own papers and get copies in standard print or braille.

The Total Talk system from MCS is described as a complete computer workstation for the blind. It includes a personal computer, word processor, terminal, voice mail, and braille production system. Features of the Total Talk PC include a touch sensitive screen — it will speak the word that is touched on the screen; a speech pad which controls speech speed, pitch, pauses between words, and volume; an enunciator key which announces the chosen function; and a spelling checker which catches spelling mistakes. Total Talk can run many of the programs provided for standard personal computers.

MOBILITY IMPAIRMENTS

Input Devices

People with minimal keyboard ability have the benefit of various systems which reduce the number of keystrokes necessary to produce a message or a command. Many display a matrix on the screen from which the user makes a choice, normally by combining a column number with a row number. Keyboard masks can be fitted to accommodate uncontrolled hand movements.

Severely disabled individuals can control computer technology by a host of alternative input devices in place of the standard keyboard. In addition to the joystick, brow wrinkle switch, foot switch, and tongue switch, there are pointers that can be strapped to the hand or to the head, optical pointers that aim a beam of light, and pneumatic "sip-n-puff" straws that are blown and sucked. Wheelchairs that obey voice commands have been demonstrated and voice entry terminals for computers are becoming standard products. An eye-gaze keyboard is being developed by Sentient Systems. No special appliances are worn by the user who is able to activate one of the sixty keys by simply looking at the chosen key. One of the most sensitive input devices is the myoelectric interface which detects the minute electrical signals involved in the contraction of a muscle. It should be noted that many of the alternative input devices remain at the experimental stage and have yet to be fully tested by real-life applications over a prolonged period of time. In this regard Leifer (1983) offers some words of caution:

> While the human voice is capable of making thousands of utterances, only one or two can be machine recognized per second. The physiological signal channels (electromyogram and electroencephalogram) are conceptually elegant but unreliable. In the case of eye movement command/control, it is ... important to note that fatigue is usually proportional to the degree to which conscious attention is required in the control task.

Environmental Control Systems

A severely disabled individual is cut off from the direct control of his or her personal space and is unable to use the vast array of gadgets which most of us depend upon for our personal and vocational well-being. For individuals who are nearly totally paralyzed an environmental control system facilitates the operation of various electrical devices without assistance, thus promoting functional independence and improving the quality of life in the home, hospital, educational, or work setting. Such electrical devices include: automatic dialing telephone, television, fan, lights, intercom, radio, emergency alarm, and electric bed control. The control unit is operated from the bed, wheelchair, or work station. It is tailored to whatever functional movements an individual possesses. An environmental control system that utilizes a personal computer has been developed by the University of Alabama in Birmingham and is known as the C2E2 system (Communications, Control, Education, and Entertainment). The system is controlled by options selected from a control menu that appears on the computer's screen. In addition to operating the telephone and other appliances the user is able to take advantage of regular computer functions, such as typing letters and other documents, filing and retrieving information,

running educational and entertainment programs, and networking. The C2E2 is usually controlled by voice commands but will accept other kinds of input.

Robots

Personal robots will probably replace or interface with environmental control systems. An interactive robotic aid has one or more manipulators (arms) which can be moved within the environment to bring an end effector (hand) to any position within a prescribed space. Models for robotic manipulation devices have been developed by a number of agencies including John Hopkins University and the Veterans Administration New York Prosthetic Center.

In conjunction with the Palo Alto Veterans Administration Medical Center, Stanford University has developed a prototype robotic arm which is mounted on a console and operated by voice command. Although still in the research stage, this device can retrieve files from a drawer, turn pages in a book, draw and paint, pick up a telephone receiver, play board games, and prepare a meal. Researchers at Stanford are also exploring the potential as human helpers of such state of the art robots as the mobile, cannister-shaped RB5X.

The design philosophy of the "robotic aid" research community is that a disabled individual is best served by a single, general purpose system, rather than a collection of special purpose devices. By providing interactive command and control of manipulation in a relatively unstructured domestic environment, the researchers view the robot as an economically feasible partial substitute for human caretaking. Leifer (1983) suggests there are five primary applications where robotic aids will demonstrate superiority over other means for supporting independent living by persons with severe physical impairments:

1. ACTIVITIES OF DAILY LIVING: food preparation; food service; personal hygiene.
2. MEDICAL THERAPY: limited physical therapy; some forms of diagnostic testing.
3. PERSONAL CLERICAL TASKS: calculator and computer operation; use of commercial telecommunication devices; appliance control; office materials handling.
4. VOCATIONAL TASKS: supervision of industrial automation systems; computer and manipulator programming; assembly and inspection; secretarial work; switchboard operation.
5. RECREATION: control of environmental games; manipulation in physical games such as chess and monopoly; avocational work; painting.

HEARING AND SPEECH IMPAIRMENTS

Speech Analyzers

The non-speaking population includes individuals who are deaf and those with various kinds of communication disorders. These impairments deprive individuals of the joys of communication. Often non-speaking persons are believed to be uneducable only because they cannot express what they know. Various devices for the hearing impaired or those with vocal disorders can provide visual displays of the spoken word and can assist in the formation of intelligible speech. By means of a Speech Spectographic Display (SSD) words spoken into a microphone are translated into a broadband spectogram on a television screen. A student practices sounds and words by matching the pitch, tone, intensity, and duration of utterances to model patterns created by an instructor who enunciates the word correctly. Thus individuals who have never heard themselves talk can improve speaking skills by literally seeing what they say. This technology is very necessary in light of the fact that the majority of profoundly deaf children finish their education without intelligible speech (Jensema, et al., 1978). Studies have shown that independent drill with speech display creates better vocal production and increases motivation. Visual speech displays are useful to speech clinics, schools for the deaf, special education departments, rehabilitation programs, etc. Considerable gains in time and cost effectiveness have been demonstrated as a result of the utilization of speech analyzers in training (Houde and Braeges, 1979). The Video Voice Training System includes an SSD, computer hardware and software, television receiver, and various instructional materials.

TDDs

In recent years telecommunications devices for the deaf (TDDs) have enabled the deaf and hearing impaired to communicate over telephone lines using the printed word. The spread of personal computers has furthered the ability to transmit information using telephone lines and a number of computer networks have come into existence. The Baudot encoding system of a teletypewriter (TTY) is not compatible with the ASCII system used by a computer, but modifications are now available that enable a PC user to communicate with both Baudot and ASCII devices. Some of the modern TDDs such as Audiobionics' Lifestyle Personal Communicator are able to utilize both encoding systems. This portable device includes features such as a programmable memory, speech synthesizer, message capability, alarm, and word-processing functions.

Computer Networks

Computer networks provide two-way communication possibilities (e.g. electronic mail) and access to various kinds of information. For the hearing impaired, networking provides the opportunity to communicate interactively in a situation of equality. Deaf children in particular, can benefit from practicing language in a real world situation in which their disability does not create an ongoing disadvantage. Networks currently in existence include The Source, CompuServe, and Special Net. Other experimental networks such as Deafnet, focus on special needs groups and are operated by such institutions as NARIC and Gallaudet College in Washington, D.C. (NARIC, 1984). CompuServe offers services for handicapped computer users and in the future will include public information from the Social Security Administration. Special Net provides the disabled with bulletin board services and includes special services such as ASHA Update, NARIC Report, Deafness, Vision, and NCAH News. Not limited to bulletin board or electronic mail functions, networks such as Game Store provide the opportunity for recreational activities.

Augmentative Communication Aids

Various assistive technologies are now available that provide augmentative communication to this population. A battery-operated pocket typewriter that prints on a paper roll is an inexpensive device that can provide rudimentary communication to non-speaking individuals. Many people who are severely physically handicapped, however, cannot write or use a conventional keyboard. Current technology can utilize an individual's limited movements to operate devices that express needs or ideas. The Handi-Writer is such a communication aid. By closing a single switch (e.g. footswitch, eyebrow microswitch, sip-n-puff straw) the user can construct words and sentences on an ordinary television screen. In addition, the text may be printed out on a printer or "spoken" through the television using an optional voice synthesizer (Bulletins on Science and Technology for the Handicapped, 1984). A synthesized speech system which operates through a highly modified pair of glasses has been developed by the University of Denver's Research Institute. A tiny chart with letters is located in front of one lens. By steadying one's gaze in precise spots the user can spell out what is desired. An electronic voice recites the letters as they are printed out across a small screen and the messages are printed out on paper.

Portable microprocessor-based aids housed in a wheelchair laptray configuration can provide non-speaking persons with the ability to hold conversations, speak on the phone, shop for items, and order meals in restaurants. Such communication systems are operated by a matrix keyboard and normally allow the option of a printed message or synthesized speech output. In addition, to pre-programmed words and phrases, a storage area allows personal information to be programmed by the user for retrieval by a single selection. The VOIS 130 manufactured by Phonic Ear is such a system as are EXPRESS 3, Autocom, and MINSPEAK 1 from Prentich Romich Company. The Autocom is designed to accommodate erratic movements from individuals with severe cerebral palsy and can be operated by a magnetic handpiece or alternatively a headstick. MINSPEAK 1 can be operated by any severely handicapped individual who has a reliable body movement. A degree of naturalness can be obtained from the synthesized speech because the user can emphasize or de-emphasize a word by controlling the pitch or duration of individual phonemes. By this means, a question can be

made to sound like a question. When fitted with a keyboard emulator many electronic communication aids can serve as a data entry terminal for a computer and also interface with an environmental control system.

IMPAIRMENTS IN COGNITIVE FUNCTIONING

The human brain is an instrument designed to deal with real-world situations, therefore, many of the devices described in the previous sections enhance cognitive functioning to some extent because they improve an individual's interaction with the environment. Because the computer is essentially a manifestation of human rationality it is an ideal vehicle for promoting reasoning skills. Bowe (1984) states that "some of the most dramatic applications of microcomputers occur with children, youth, adults, and older individuals with various kinds of mental limitations." Computer applications for special-needs students are beneficial because the game-like quality of many interactive programs helps keep the participants motivated. The dynamic presentation utilizing color animation and speech synthesizers foster an increased attention span. The immediate and nonjudgmental feedback promotes learning. Success in using the computer is reinforcing also as it fosters a sense of accomplishment and pride.

Maplewood Handicapped Children's Center in Edmonds School District, Washington, has designed over a dozen training programs to develop both motor and cognitive skills of severely physically handicapped, non-vocal students. Since the children are not verbally-oriented the programs use color, sound, and graphics. A remedial and diagnostic program for learning-disabled students has been designed at Robert E. Lee High School in San Antonio, Texas. The program aims to develop memory, concentration, reading, spelling, and vocabulary skills. "Because of the program's game-like format, structured contents, and immediate reinforcement for correct responses, learning-disabled students with attention spans as short as three minutes were able to demonstrate academic growth comparable to that of their able-bodied peers while using the program" (Bowe, 1984). The North Shore Children's Hospital in Salem, Massachusetts has also developed computer programs to help learning disabled children.

LOGO, the turtle-based programming language is successful with many special-needs individuals. Because it requires very little language it has proven to be effective with people whose mastery of the language is restricted. Research at Texas Technological University has demonstrated that LOGO offers a unique way to teach abstract concepts to learning-disabled and retarded individuals who are having difficulty grasping nonconcrete ideas. MCE, Inc. recently announced the release of special education software named "The Lost R—Reasoning" which is designed for special-needs students and provides instruction and practice in the use of reasoning skills. Programs have also been developed to help stroke or head-injury patients to recover visual perception and memory skills. Bowe (l984) informs us that the Atari "Hangman Game" and the "Brain Game" are found to be useful at the Brain Injury Rehabilitation Unit of the Veterans Administration Medical Center at Palo Alto, California. The unit serves veterans with brain conditions resulting from accidents, strokes, brain tumors, and degenerative diseases.

COSTS

There is no doubt that technology can expand the horizons of the nonwhite disabled. Yet, many factors render the production of assistive devices a precarious industry: the novelty of the technologies, the high costs, lack of prolonged testing, and inadequate attention to consumer education. Irrespective of their social benefits, technologies often compete according to economic criteria whereby profitability determines which technology is developed. Mass production can keep down the cost of items that have substantial markets, such as a device that is useful to a large number of blind people. The cost of small assistive gadgets for the blind such as talking watches or thermometers range from $30 to $100, while professional programmable calculators with print and braille output can cost over $1,000. As a microcomputer accessory, speech synthesizers start around $300. In contrast the Total Talk PC costs $7,995, the Versa Braille word processor costs about

$7,000, and the Kurzweil Reading Machine costs $30,000.

Much of the computer technology available for the handicapped today is so expensive that it is generally purchased by employers, vocational rehabilitation programs, or educational institutions. A representative of one firm that sells microcomputer equipment for the visually impaired estimates that only 5% to 10% of that company's sales are for home usage. Unlike reading machines or braille word processors, augmentative communication aids for non-vocal individuals do not easily accommodate shared usage and do not therefore represent a viable institutional purchase. For an individual they represent a considerable expense. The Handi-Writer is one of the most economical communication aids and ranges from $400 to $800 according to the number of options available. Portable speech synthesizers are more expensive. The VOIS 130 costs $3,000, the EXPRESS 3 with optional speech included costs $4,900, and the MINSPEAK 1 retails at $5,990. The Video Voice Speech Training System is marketed for use in speech clinics and at $3,250 is relatively inexpensive. Audiobionics' Lifestyle Personal Communicator which combines TDD capabilities with a speech synthesizer is priced at $1,759. It is worth noting that all federal agencies are required by law to provide equipment and services that handicapped employees need to do their jobs.

The price of environmental control systems varies according to the number of options and the types of electrical devices that are operated. The expense of independent living devices may well be offset by savings experienced due to a decrease in human caretaking. Leifer (1983) anticipates that a robotic aid for a severely disabled individual represents feasible partial substitute for 24-hour attendant care. He states: "While it is premature to make definitive statements regarding Robotic Aid economics . . . one may speculate that a widely available robotic manipulation aid would cost about as much as a personal automobile and come in an equivalent variety of models."

Funding Sources

Funding for assistive technology can come from a variety of sources. Government programs that have provided funds for assistive devices include Medicaid; Medicare (which has not to date funded electric communication aids); Offices of Vocational Rehabilitation; Veterans Administration; Developmentally Disabled Programs; programs which are known alternatively as Bureau of Medical Rehabilitation, Crippled Children Services, or Physically Handicapped Program; Committees on the Handicapped formed to comply with PL 94-142; government employers affected by PL 95-602; and complementary minority programs such as those for the blind, deaf, mentally retarded, mentally restored, psychiatrically handicapped, and aged. Voluntary health organizations that are potential funding sources include the United Cerebral Palsy Association Easter Seal Society, National Multiple Sclerosis Society, Muscular Dystrophy Association, National ALS Foundation, ALS Society of America, and United Fund-sponsored programs. In addition, the social services allocate funds for vocational rehabilitation and developmental disabilities programs; health services authorize expenditures for medical, surgical, and corrective care for individuals with limited means; and education agencies undertake to meet the specialized needs of disabled children and emphasize services for the severely handicapped. There are alternatives to the outright purchase of assistive devices. Various voluntary organizations and medical facilities support loan equipment pools. Some even try to give devices to individuals who qualify for an authorized program. A few manufacturers provide equipment for extended trial periods, while others have leasing programs by which a device can be purchased over a period of time.

Because many assistive devices represent a new and unfamiliar technology, ignorance of their potential application results in administrative blind spots. For example, while most bureaucrats would agree that a wheelchair is essential to a paraplegic, few are prepared to admit that an expressive communication aid is equally necessary for a non-speaking person. An individual who is severely disabled as a result of the catastrophic effects of an illness or injury may well encounter this problem of shortsighted attitudes with an insurance company and find that they balk at covering the cost of an assistive device. Insurance companies often avoid coverage of an electronic communi-

cations aid by classifying it as an "educational" rather than a "medical" device. It is even more difficult to obtain reimbursement for daily living systems for the severely physically disabled for they do not represent a clear medical, vocational, or educational expense. The critical ethical issues that problems of classification of devices raises clearly demonstrates the need for enlightened debate in order to effect a change in administrative attitudes towards the new assistive technologies.

Advocacy and Consumer Education

If attempts to acquire funds for assistive devices through conventional funding sources are unsuccesful, then more creative strategies can be brought to bear on the situation. Ruggles (1982) outlines a four-step procedure for securing funds. The first step is self-evaluation; the second step is expanding information resources; the third step is advocacy; and the fourth step is exploring funding sources and strategies. Ruggles emphasizes that the client's family should be included in the advocacy process. Additionally, an expressed willingness on the part of the client and his family to provide a portion of the purchase price helps create a favorable impression for subsequent endeavors. Various committees and coalitions that have the knowledge and experience to be effective advocates can be contacted. Ruggles recommends an examination of plans for spending block grant monies. He also recommends that legislators, program administrators, and school board members are solicited for support during informational visits, and letter writing and phone campaigns. Various service and church-affiliated organizations are often ready to help handicapped individuals secure their needs. By utilizing creative strategies, funds might be forthcoming from employers, labor unions, major corporations, and workman's compensation programs. One strategy often used by whites is to mount a media campaign and call for sponsors around a deserving individual who has obtained a device on a temporary basis by loan or for a limited trial period. Public awareness can also be heightened through special fund-raising events. Certain civic or community organizations are often ready to assist in the sponsoring of fund-raising drives. Ruggles suggests that creative funding strategies should include the possibility of matching or combining donations acquired from different sources in order to reach the total amount required.

Problems of high prices of the innovative but unfamiliar technologies and the financial instability of the disabled as a consumer group are compounded by unenlightened administrative attitudes. This results in a general under-utilization of assistive devices. There must be a greater degree of human interface and trilateral cooperation between nonwhite individuals with disabilities, the service organizations which represent the disabled, and the manufacturers of assistive technology. Such a partnership could enlighten attitudes concerning the new devices and highlight issues of cost, availability, and equity of access. More attention to consumer education is also urgently needed. It is currently too slow, too happenstance, and too dependent on ethnicity, socio-economic status, sex, and age. There is also a need for constant communication between the designers of assistive technology and the nonwhite consumer. As Leifer (1983) states 'It is imperative that technical people establish and maintain a constructively critical dialogue with prospective users of their product.' As a result of these measures it can be anticipated that more nonwhite individuals with disabilities would learn to define and articulate their own needs more clearly and become involved with the process of self-advocacy.

References

Blaschke, C.L. (1985). Technology trends in special education. *T.H.E. Journal.* Santa Ana, CA: Information Synergy Inc. *12* (6).

Bordley, E. (1984). Sensory Assistance Center, Library-Gram. Washington, D.C.: Office of Information Technology, U.S. Department of Justice.

Bowe, F.G. (1980). *Rehabilitating America.* New York: Harper and Row.

Bowe, F.G. (1983). *Demography and disability: A chartbook for rehabilitation.* Little Rock: University of Arkansas. Arkansas Rehabilitation Research and Training Center.

Bowe, F.G. (1984). *Personal computers and special needs.* Berkeley, CA: Sybex Inc.

Bulletins on Science and Technology for the Handicapped. (1984). Washington, D.C.:

Association for the Advancement of Science, Office of Opportunities in Science. *4* (4).

Frank, M. (I983). Daily living technology for the disabled: Can it be a viable business? *Technology for Independent Living II: Proceedings of the 1981 workshops on science and technology for the handicapped*. Washington, D.C.: American Association for the Advancement of Science, Project on the Handicapped in Science.

Houde, R. A. and Braeges, J. L. (1979). *Independent drill: a role for speech training aids in the speech development of the deaf.* New York: The Center for Communications Research at the Rochester School for the Deaf.

Jensema, C. J., Karchmer, M. A., and Trybus, R. J. (1978). The rated speech intelligibility of hearing impaired children: Basic relationships and a detailed analysis. Washington, D.C.: Gallaudet College, Office of Demographic Studies, Series R, No. 6.

Kakolik, J., et al. (1983). *Study of special education costs*. Santa Monica, CA: Rand Corp.

Leifer, L. J. (1983). Robotic manipulation aids in rehabilitation. *Technology for Independent Living II. Proceedings of the 1981 workshops on science and technology for the handicapped*. Washington, D.C.: American Association for the Advancement of Science, Project on the Handicapped in Science.

Lyons, G. (1984). Reading devices for the blind fact sheet. Washington, D.C.: Martin Luther King Memorial Library, Library for the Blind and Visually Impaired.

NARIC. (1984). *ABLEDATA Thesaurus*. Washington, D.C.: The Catholic University of America, National Rehabilitation Information Center.

Ruggles, V. (1982). *Funding of non-vocal communication aids: Current issues and strategies*. Flushing, NY: Queens College Speech and Hearing Services Center, Inc.

Unger, B. (1983). Daily living technology for the disabled: Can it be a viable business? *Technology for Independent Living II. Proceedings of the 1981 workshops on science and technology for the handicapped)*. Washington, D.C.: American Association for the Advancement of Science, Project on the Handicapped in Science.